

**EXAMPLE 2** Check the solutions of an equation

Check the solutions of the equation from Example 1.

**Solution**

The solutions of  $x^2 - 6x + 3 = 0$  are  $3 + \sqrt{6}$  and  $3 - \sqrt{6}$ . You can check each solution by substituting it into the original equation.

Check  $x = 3 + \sqrt{6}$ :

$$x^2 - 6x + 3 = 0 \quad \text{Write original equation.}$$

$$(3 + \sqrt{6})^2 - 6(3 + \sqrt{6}) + 3 \stackrel{?}{=} 0 \quad \text{Substitute } 3 + \sqrt{6} \text{ for } x.$$

$$9 + 6\sqrt{6} + 6 - 18 - 6\sqrt{6} + 3 \stackrel{?}{=} 0 \quad \text{Multiply.}$$

$$0 = 0 \quad \checkmark \quad \text{Solution checks.}$$

Check  $x = 3 - \sqrt{6}$ :

$$x^2 - 6x + 3 = 0 \quad \text{Write original equation.}$$

$$(3 - \sqrt{6})^2 - 6(3 - \sqrt{6}) + 3 \stackrel{?}{=} 0 \quad \text{Substitute } 3 - \sqrt{6} \text{ for } x.$$

$$9 - 6\sqrt{6} + 6 - 18 + 6\sqrt{6} + 3 \stackrel{?}{=} 0 \quad \text{Multiply.}$$

$$0 = 0 \quad \checkmark \quad \text{Solution checks.}$$

**PRACTICE****EXAMPLES 1 and 2**

on pp. 727–728  
for Exs. 1–18

Solve the equation using the quadratic formula. Check the solution.

1.  $x^2 + 4x + 2 = 0$

2.  $x^2 + 6x - 1 = 0$

3.  $x^2 + 8x + 8 = 0$

4.  $x^2 - 7x + 1 = 0$

5.  $3x^2 + 6x - 1 = 0$

6.  $2x^2 - 4x - 3 = 0$

7.  $5x^2 - 2x - 2 = 0$

8.  $4x^2 + 10x + 3 = 0$

9.  $x^2 - x - 3 = 0$

10.  $x^2 - 2x - 8 = 0$

11.  $-x^2 + 7x + 3 = 0$

12.  $x^2 + 3x - 9 = 0$

13.  $-\frac{5}{2}x^2 + 10x - 5 = 0$

14.  $\frac{1}{2}x^2 + 3x - 9 = 0$

15.  $3x^2 - 2 = 0$

16.  $-2x^2 - 7x = 0$

17.  $3x^2 + x = 6$

18.  $x^2 - 4x = -2$

19. Show that  $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$  and  $\frac{-b - \sqrt{b^2 - 4ac}}{2a}$  are solutions of  $ax^2 + bx + c = 0$  by substituting.

20. Derive a formula to find solutions of equations that have the form  $ax^2 + x + c = 0$ . Use your formula to find solutions of  $-2x^2 + x + 8 = 0$ .

21. Find the sum and product of  $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$  and  $\frac{-b - \sqrt{b^2 - 4ac}}{2a}$ . Write a quadratic expression whose solutions have a sum of 2 and a product of  $\frac{1}{2}$ .

22. What values can  $a$  have in the equation  $ax^2 + 12x + 3 = 0$  in order for the equation to have one or two real solutions? *Explain.*